Diffusion Modeling Based on Customer’s Review and Product Satisfaction

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ABSTRACT

The purpose of this paper is to determine the internal/external factors that lead to fluctuation in marketplace. Before introducing new products in the market, organization needs proper understanding of the market which can be realized through sound mathematical modeling and scientific decision making tools. The objective is as follows: market size is determined by the number of customers a product is flanked by; therefore, it becomes critical to understand satisfaction of demanders as one of the metric for measuring performance of the product. In this paper, the authors have discussed how the adoption takes place in accordance with the market fluctuation. For this purpose, they have developed four different methodical frameworks to help the management to estimate sales due to varying behaviour of market (as per reviews about the product). Analysis and validation has been done on two different real life datasets. Weighted Criteria Value Approach (WCVA) has been applied to rank the models by using several goodness of fit collectively.

KEYWORDS
Diffusion Modeling, Dissatisfaction, Market Expansion, Market Reduction, Product Performance, Weighted Criteria Value Approach

1. INTRODUCTION

Innovation is today’s need for successful penetration in the market. The changing social & economic needs and increasing competition are forcing organizations to innovate in terms of new product and market principles. Therefore, it is mandatory for an organization to be creative, competitive and customer focused. By making maximum use of the opportunities, the organization should organize effective and efficient marketing strategies to manage their relationship with the targeted customers. Firm must introduce new products while knowing that their product may not long last in the market. Management must espouse the most favorable policies, ahead of taking any decision about the introduction of the new product.

The diffusion process plays a key role in the field of marketing research. The four key elements of diffusion process are: innovation, channels of communication, time and social system. Therefore, the innovation-diffusion has been defined as the process by which the innovation “is communicated through certain channels over time among the members of a social system” (Rogers, 1995). The process of innovation and diffusion of a new product is necessary to understand the market position for any organization. Since the start of 1960’s diffusion research is the key in modeling framework in marketing which targeted the entire life-cycle of an innovation; from the perspective of communications...
and consumer reaction (Aggrawal et al., 2014). The Bass model (1969) is the well-known and most widely used model for the diffusion of innovation in marketing literature. Later on, many researchers like Lehman, (2012); Aggrawal et al., (2013); Anand et al., (2015); Hu et al., (2015) have developed their diffusion models and have tried to apply them in different marketing situations.

The discrepancy between the product performance and customers’ expectation leads to satisfaction or dissatisfaction from the product. Some different customers have different needs and expectations from a particular product, therefore, a situation may arise where a product may be satisfactory for one customer, and for other customers it may lead to dissatisfaction. This altering behavior of customers is difficult to understand and measure. A firm can acquire customers from a pool of nonusers and from those who would like to switch from other brands, whereas on the other hand, there are some potential customers who might be dissatisfied with the same product (Libai et al., 2009). Both types of customers can affect market of the product. The first one leads to expansion in the market size that may increase slowly or rapidly, and other type de-escalates market size by rejecting the product.

A two-factor theory has been developed by Herzberg Frederick that distinguishes dis-satisfiers from satisfiers (Jack Ewing, 2007). The two implications of Herzberg’s theory are:

- Dissatisfied customers should be avoided by the company by making some constructive efforts;
- Identification of satisfiers and motivators for selling the product.

Various social, economic, cultural, political-legal and technological factors affect the market activities and also buying behavior of the customers. Understanding and analyzing the market environment helps the company to identify which market strategy will be best for them. A company tries to raise their products’ market size by attempting different marketing strategies on their new products. Market size may vary (either increase or decrease) due to many different factors. For instance, as stated by Swaraj Baggonkar (2015) that an increase in excise duty by at least four percent across vehicles, causes the price hike in cars, and lowers its demand. The impact of the changes in market size can be seen on the total sales of the product. If there is any government policy that has positive effect on the product, then the demands of the product certainly shoot up. Similarly, the positive word of mouth of the innovators also leads to increase in the market size whereas negative word-of-mouth from the dis-satisfied customers decreases the market potential of the product. Market expansion (reduction) is the phenomenon where the growth of the product/company increases (decreases), which may behave linearly or exponentially.

In literature, marketers have talked about the market expansion with time but it is not always true as sometimes market surge upward and sometimes it steeps downward in the diverse condition of the market. The main focus of this paper is to provide a framework that enables us to understand that how the dynamic adoption behavior of customers affects the growth of the market and helps in the analysis of growth of the product. We have examined the three different market expansion scenarios, first, linear increase in market size with respect to time; second, exponential increase in market size with respect to time and third, behavior of repeat buyers. Also, we have studied the market size reduction due to dissatisfaction of potential buyers. In this paper we have considered four diffusion models to estimate the expected number of adopters. An analysis of the market goodwill and external factors (social, economic and cultural) as well as internal factors (promotional and marketing strategies, quality of a product) influencing diffusion of the product has been presented in this paper. Four different models of diffusion process have been proposed by considering different market scenarios and also tested statistically using sales data of two different types of usage products. Every model is able to provide the good result on the specific data set, but no single model justifies all the data sets. In order to find
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